

CLAIMS

What is claimed is:

1. An electrophotographic image forming apparatus including a fixing unit and a driver rotating the fixing unit, the fixing unit comprising:
 - a heat roller assembly comprising a heat roller, a gear cap coupled to a first end of the heat roller and transmitting rotation to the heat roller, and an elastic member coupling the gear cap with the heat roller; and
 - a pressing roller pressing a recording medium passing between the pressing roller and the heat roller toward the heat roller,
 - the gear cap comprising an insertion portion inserted in the heat roller, and a gear portion integrally provided adjacent to the insertion portion and rotated by the driver, and
 - the elastic member being provided between an outer circumferential surface of the insertion portion of the gear cap and an inner circumferential surface of the heat roller, and coupling the gear cap with the heat roller.
2. The image forming apparatus according to claim 1, wherein: the elastic member forms a pair, and
 - in the outer circumferential surface of the insertion portion of the gear cap, there is positioned a pair of elastic member accommodating parts, to accommodate the pair of elastic members.
3. The image forming apparatus according to claim 2, wherein at least one of the pair of the elastic members comprises:
 - an elastic portion accommodated in the elastic member accommodating part of the insertion portion and elastically pressed by the heat roller;
 - bending portions positioned on opposite ends of the elastic portion, which, when installed in the heat roller assembly, are bent toward the heat roller; and
 - a locking portion provided in an end of the bending portion and contacting the inner circumferential surface of the heat roller by an elasticity of the elastic portion.

4. The image forming apparatus according to claim 3, wherein the locking portion is hook-shaped, to prevent the gear cap from breaking away from the heat roller and prevent the gear cap from rotating relative to the heat roller.

5. The image forming apparatus according to claim 4, wherein the locking portion comprises material with a hardness higher than material of the inner circumferential surface of the heat roller.

6. The image forming apparatus according to claim 5, wherein:
in the first end of the heat roller, the heat roller has a projection accommodating part positioned in a lengthwise direction of the heat roller, and
the gear cap is provided with a projection to be accommodated in the projection accommodating part.

7. The image forming apparatus according to claim 1, wherein the heat roller assembly comprises an end cap coupled by a second elastic member to a second end of the heat roller.

8. The image forming apparatus according to claim 3, wherein at least one of the pair of the elastic members further comprises at least one protrusion provided on the elastic portion between the pair of bending portions and protruding toward the heat roller.

9. The image forming apparatus according to claim 8, wherein the protrusion is bent from the elastic portion and contacts the inner circumferential surface of the heat roller to press the elastic portion.

10. A heat roller assembly of an electrophotographic image forming apparatus including a driver, the heat roller assembly comprising:
a heat roller;
a gear cap having
an insertion portion inserted into a first end of the heat roller and having an elastic member accommodating part, and

a gear portion adjacent to the insertion portion and transmitting rotary motion from the driver to the heat roller assembly; and

an elastic member disposed in the elastic member accommodating part and coupling the gear cap to the first end of the heat roller and to prevent the gear cap from rotating relative to the heat roller.

11. The heat roller assembly according to claim 10, wherein the elastic member accommodating part is a recess positioned on an outer circumferential surface of the insertion portion.

12. The heat roller assembly according to claim 10, wherein:
the heat roller assembly further comprises
a heater disposed in the heat roller,
a power supply, and
an end cap capping a second end of the heat roller; and
the gear cap and the end cap each comprise an electrode connected to the power supply to supply power to the heater.

13. The heat roller assembly according to claim 12, wherein the end cap and the heat roller are integrally formed.

14. The heat roller assembly according to claim 12, wherein the end cap comprises:
an insertion portion inserted into a second end of the heat roller and having an elastic member accommodating part, to accommodate a second elastic member, to couple the end cap to the second end of the heat roller.

15. The heat roller assembly according to claim 10, wherein the elastic member comprises:
an elastic portion;
a bending portion positioned at an end of the elastic portion and bent away from the elastic portion; and

a locking portion positioned at an end of the bending portion and contacting an inner circumferential surface of the heat roller due to an elasticity of the elastic portion, to couple the gear cap to the first end of the heat roller and to prevent the gear cap from rotating relative to the heat roller.

16. The heat roller assembly according to claim 15, wherein:
the bending portion forms a pair positioned at opposite ends of the elastic portion; and
the locking portion forms a pair, respectively positioned ends of the pair of bending portions.

17. The heat roller assembly according to claim 15, wherein:
the elastic member accommodating part is a recess positioned on an outer circumferential surface of the insertion portion; and
when the elastic member is accommodated in the elastic member accommodating part, the bending portion extends out of the elastic member accommodating part.

18. The heat roller assembly according to claim 15, wherein the elastic portion is arc-shaped.

19. The heat roller assembly according to claim 15, wherein the locking portion is hook-shaped.

20. The heat roller assembly according to claim 19, wherein when the elastic portion is accommodated in the elastic portion accommodating part and the insertion portion is inserted into the first end of the heat roller, the locking portion forms an acute angle with respect to the inner circumferential surface of the heat roller in an inserting direction, to aid insertion into the heat roller.

21. The heat roller assembly according to claim 20, wherein the locking portion forms an obtuse angle with respect to the inner circumferential surface of the heat roller in a removing direction opposite the inserting direction, to prevent removal from the heat roller.

22. The heat roller assembly according to claim 15, wherein the locking portion has a hardness greater than a hardness of the inner circumferential surface of the heat roller.

23. The heat roller assembly according to claim 22, wherein:
the heat roller is made of aluminum; and
the locking portion is made of steel.

24. The heat roller assembly according to claim 10, wherein:
the insertion portion comprises a projection; and
the first end of the heat roller has a projection accommodating part accommodating the projection when the gear cap is inserted into the first end of the heat roller.

25. The heat roller assembly according to claim 15, wherein the elastic portion comprises:
a protrusion extending from the elastic portion and contacting the inner circumferential surface of the heat roller when the gear cap is inserted in the first end of the heat roller.

26. The heat roller assembly according to claim 25, wherein with respect to the elastic portion, a height of the protrusion is less than a height of the locking portion.

27. The heat roller assembly according to claim 25, wherein with respect to the elastic portion, a height of the protrusion is approximately equal to a height of the locking portion.

28. The heat roller assembly according to claim 25, wherein the protrusion extends from a side of the elastic portion facing the inner circumferential surface of the heat roller.

29. The heat roller assembly according to claim 25, wherein the protrusion forms a plurality of protrusions extending from the elastic portion and contacting the inner circumferential surface of the heat roller when the gear cap is inserted in the first end of the heat roller.

30. A heat roller assembly of an electrophotographic image forming apparatus including a driver, the heat roller assembly comprising:

a heat roller;

a pair of end caps, respectively engaging opposite ends of the heat roller, each end cap having an insertion portion inserted into one of the opposite ends of the heat roller, each insertion portion having at least one elastic member accommodating part; and

a plurality of elastic members,

one of the pair of end caps having a gear portion transmitting rotary motion from the driver to the heat roller assembly, and

the plurality of elastic members being disposed in the elastic member accommodating parts and coupling the end caps to the respective opposite end of the heat roller, to prevent the end caps from rotating relative to the heat roller.